Trigonometry Final Exam

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MATH

Trigonometry Final Exam

This exam is comprehensive over the entire course and includes 12 questions. You have 60 minutes to complete the exam.

The exam is worth 100 points. The 8 multiple choice questions are worth 5 points each (40 points total) and the 4 free response questions are worth 15 points each (60 points total).

Mark your multiple choice answers on this cover page. For the free response questions, show your work and make sure to circle your final answer.

1. (5 pts) A B C D E

2. (5 pts) A B C D E

3. (5 pts) A B C D E

4. (5 pts) A B C D E

5. (5 pts) A B C D E

6. (5 pts) A B C D E

7. (5 pts) A B C D E

8. (5 pts) A B C D E

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1. **(5 pts)** If a circle has diameter of 8 feet, what is the area A (in square feet) of the sector with a central angle of $150°$?

A $A = 64\pi$

C $A = \frac{32}{75}\pi$

E $A = \frac{20}{3}\pi$

B $A = \frac{8}{75}\pi$

D $A = \frac{80}{3}\pi$

2. **(5 pts)** A car whose wheels are 20 inches in diameter is traveling at 60 miles per hour. What is the angular velocity ω in revolutions per second?

A 105.6 rev/sec

C 3 rev/sec

E 16.81 rev/sec

B 8.8 rev/sec

D 8.403 rev/sec

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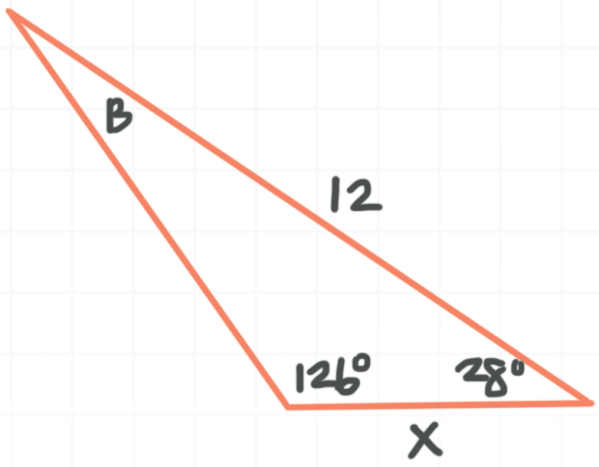
3. **(5 pts)** Solve for x in the triangle below using the law of sines. Round your answer to the nearest tenth.



A	11.2	C	6	E	7
B	11	D	6.5		

4. **(5 pts)** What is the area of the triangle with side lengths 14, 18, and 22?

A	154	C	126	E	198
B	396	D	252		

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5. **(5 pts)** What is the period of the function?

$$y = -2\cos\frac{\theta}{4}$$

A 4π

B 8π

C 2π

D $\frac{\pi}{4}$

E $\frac{\pi}{8}$

6. **(5 pts)** Write the equation of a sine function with a vertical stretch of 4, horizontal compression of 3, upward shift of 5, and a shift to the right of $\pi/4$?

A $y = 4\sin\left(3\theta - \frac{\pi}{4}\right) + 5$

B $y = 4\sin\left(\frac{\theta}{3} + \frac{\pi}{4}\right) + 5$

C $x = \frac{1}{4}\sin\left(3\theta + \frac{\pi}{4}\right) - 5$

D $x = 4\sin\left(3\theta + \frac{\pi}{4}\right) + 5$

E $x = 4\sin\left(\frac{\theta}{3} - \frac{\pi}{4}\right) + 5$

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7. **(5 pts)** What is the exact value of $\cos 75°$?

A $\dfrac{\sqrt{6}-\sqrt{2}}{4}$

B $\dfrac{\sqrt{2}-\sqrt{6}}{4}$

C $\dfrac{\sqrt{3}+1}{2}$

D $\dfrac{\sqrt{6}-\sqrt{2}}{2}$

E $\dfrac{\sqrt{3}-1}{2}$

8. **(5 pts)** What is the exact value of $\cos 75° \sin 15°$?

A $\dfrac{2+\sqrt{3}}{4}$

B $\dfrac{2+\sqrt{3}}{2}$

C $\dfrac{2-\sqrt{3}}{4}$

D $\dfrac{\sqrt{3}-2}{2}$

E $\dfrac{\sqrt{3}-2}{4}$

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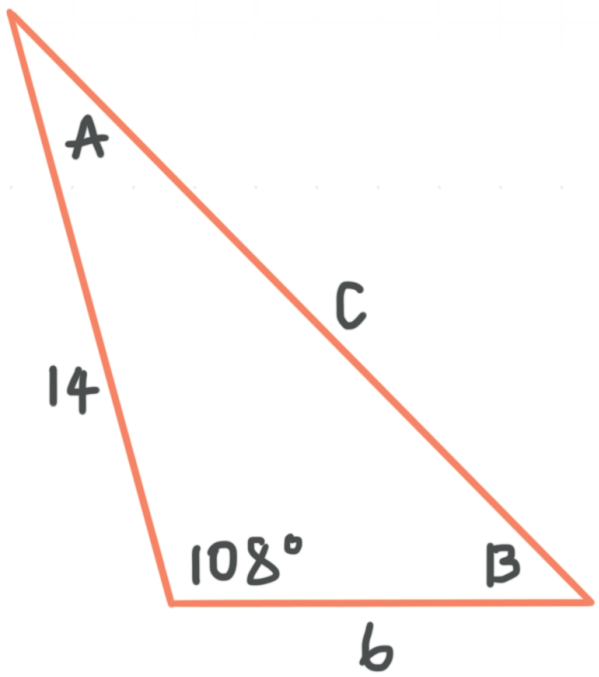
9. **(15 pts)** A drone is flying at an altitude of 400 feet above the ground. The pilot sights an object on the ground at an angle of depression of $36°$. What is the slant distance to the nearest foot from the airplane to the object? Include a diagram as part of your answer.

10. **(15 pts)** Solve for the unknown values in the triangle. Round your answers to the nearest hundredth.



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11. **(15 pts)** Sketch the graph of $y = -3\sin 2x$. Include two complete periods in your sketch.

12. **(15 pts)** Show that the equation is true. Make sure to show all of your work.

$$\frac{\sec^2\theta}{\sec^2\theta - 1} = \csc^2\theta$$

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